

Serial No. 09/960,096

Page 2 of 11

IN THE CLAIMS

1. (currently amended) A gateway digital loop carrier device comprising:

an integrated access device side terminating unit terminating a transmission signal sent from an integrated access device accommodating as a subscriber at least one of a telephone, a modem and ISDN and implementing a TR-008 interface;

a demultiplexing unit demultiplexing the terminated transmission signal into DS0 signals;

a unit performing interface conversion of the demultiplexed DS0 signal from TR-008 to TR-303 or GR-303; [[and]]

a TR/GR-303RDT unit based on TR-303 or GR-303 and having a plurality of subscriber ports for sending the interface-converted DS0 signal to a switch implementing a TR-303 or GR-303 interface; and

a signaling converting unit for converting a subscriber line signaling system between TR-008 and TR-303 or GR-303, wherein

said signaling converting unit extracts signaling information from the DS0 signals transmitted between said switch and said integrated access device, converts the extracted signaling information between TR-008 and TR-303 or GR-303, and pads the converted signaling information to the DS0 signal,

the signaling information in the TR-303 or GR-303 format is expressed in a 4-bit pattern outputted at an interval of 3 milliseconds,

the signaling information in the TR-008 format is expressed in a 2-bit pattern outputted at an interval of 1.5 milliseconds, and

84151916_1

said signaling converting unit converts the signaling information in the TR-008 format into the signaling information in the TR-303 or GR-303 format by converting the signaling information in the TR-008 format into two pieces of 2-bit patterns outputted in 3 milliseconds.

2. (previously presented) A gateway digital loop carrier device according to claim 1, wherein said interface conversion unit performing interface conversion of DS0 signals from said switch from TR-303 or GR-303 to TR-008, and wherein said gateway digital loop carrier device further comprises a multiplexing unit multiplexing interface-converted DS0 signals and a unit to transmit the multiplexed DS0 signals to said integrated access device.

3. – 6. (canceled)

7. (currently amended) A gateway digital loop carrier device according to claim [[5]] 1, wherein said signaling converting unit converts the signaling system in accordance with a line type and a signaling type of the DS0 signal.

8. (currently amended) A gateway digital loop carrier device according to claim [[5]] 1, further comprising a call control unit for executing call control of the DS0 signal with respect to said switch in accordance with TR-303 or GR-303,

wherein TR-303 or GR-303 specifies that a time slot is connected to between a source and a destination of a message for connecting the time slot of the DS0 signal in accordance with this message, and

Serial No. 09/960,096

Page 4 of 11

said call control unit, if the control target DS0 signal contains the signaling information converted in the TR-303 or GR-303 format and if this piece of signaling information indicates an Off-Hook state of said subscriber, sends to said switch a message for connecting said time slot.

9. (previously presented) A gateway digital loop carrier device according to claim 1, further comprising an ISDN overhead converting unit for converting a protocol of overhead information on an ISDN D channel that is contained in the DS0 signal between TR-008 and TR-303 or GR-303.

10. (previously presented) A gateway digital loop carrier device according to claim 9, wherein said ISDN overhead converting unit, if the line type carried on the DS0 signal from said integrated access device is ISDN and if this DS0 signal carries a D channel, extracts monitoring/controlling information out of the ISDN overhead information contained in this DS0 signal, and converts a format of the extracted monitoring/controlling information into the TR-303 or GR-303 format.

11. (previously presented) A gateway digital loop carrier device according to claim 9, wherein said ISDN overhead converting unit, if the line type carried on the DS0 signal from said switch is ISDN and if this DS0 signal carries a D channel, extracts monitoring/controlling information out of the ISDN overhead information contained in this DS0 signal, and converts a format of the extracted monitoring/controlling information into a format based on TR-008.

84151916_1

Serial No. 09/960,096

Page 5 of 11

12. (currently amended) A gateway digital loop carrier device ~~according to claim 1,~~
~~further~~ comprising:

an integrated access device side terminating unit terminating a transmission signal sent from an integrated access device accommodating as a subscriber at least one of a telephone, a modem and ISDN and implementing a TR-008 interface;

a demultiplexing unit demultiplexing the terminated transmission signal into DS0 signals;

a unit performing interface conversion of the demultiplexed DS0 signal from TR-008 to TR-303 or GR-303;

a TR/GR-303RDT unit based on TR-303 or GR-303 and having a plurality of subscriber ports for sending the interface-converted DS0 signal to a switch implementing a TR-303 or GR-303 interface;

a trouble detecting unit for detecting a trouble on a transmission path between said integrated access device and said gateway digital loop carrier device; and

a service state information converting unit for converting the detected trouble into subscriber service state information of which said switch is notified,

wherein said switch is notified of the subscriber service state information.

13. (original) A gateway digital loop carrier device according to claim 12, wherein said service state information converting unit, if the transmission path trouble is detected, sets in a stop state a service state carried on the transmission signal to said switch that is transmitted on the transmission path, and

said switch is notified of the service state information indicating the service stop state.

84151916_1

Serial No. 09/960,096

Page 6 of 11

14. (original) A gateway digital loop carrier device according to claim 13, said trouble detecting unit detects a recovery from the transmission path trouble,

said service state information converting unit, when the recovery is detected, sets in an in-service state the service state carried on the transmission signal to said switch that is transmitted on the recovered transmission path, and

said switch is notified of the subscriber service state information indicating the in-service state.

15. (previously presented) A gateway digital loop carrier device according to claim 1, further comprising a subscriber cross connect unit for connecting, to a predetermined subscriber port, the DS0 signal from said integrated access device and the subscriber line accommodated directly in said gateway digital loop carrier device.

16. (currently amended) A gateway digital loop carrier device ~~according to claim 7,~~
~~wherein comprising:~~

an integrated access device side terminating unit terminating a transmission signal sent from an integrated access device accommodating as a subscriber at least one of a telephone, a modem and ISDN and implementing a TR-008 interface;

a demultiplexing unit demultiplexing the terminated transmission signal into DS0 signals;

a unit performing interface conversion of the demultiplexed DS0 signal from TR-008 to TR-303 or GR-303;

84151916_1

Serial No. 09/960,096

Page 7 of 11

a TR/GR-303RDT unit based on TR-303 or GR-303 and having a plurality of subscriber ports for sending the interface-converted DS0 signal to a switch implementing a TR-303 or GR-303 interface; and

a signaling converting unit for converting a subscriber line signaling system between TR-008 and TR-303 or GR-303, wherein

said signaling converting unit extracts signaling information from the DS0 signals transmitted between said switch and said integrated access device, converts the extracted signaling information between TR-008 and TR-303 or GR-303, and pads the converted signaling information to the DS0 signal,

said signaling converting unit converts the signaling system in accordance with a line type and a signaling type of the DS0 signal, and

the line type and the signaling type are set on a DS0 basis by a user of said gateway digital loop carrier device.

17. **(currently amended)** A gateway digital loop carrier device ~~according to claim 10,~~ wherein comprising:

an integrated access device side terminating unit terminating a transmission signal sent from an integrated access device accommodating as a subscriber at least one of a telephone, a modem and ISDN and implementing a TR-008 interface;

a demultiplexing unit demultiplexing the terminated transmission signal into DS0 signals;

a unit performing interface conversion of the demultiplexed DS0 signal from TR-008 to TR-303 or GR-303;

84151916_1

Serial No. 09/960,096

Page 8 of 11

a TR/GR-303RDT unit based on TR-303 or GR-303 and having a plurality of subscriber ports for sending the interface-converted DS0 signal to a switch implementing a TR-303 or GR-303 interface; and

an ISDN overhead converting unit for converting a protocol of overhead information on an ISDN D channel that is contained in the DS0 signal between TR-008 and TR-303 or GR-303, wherein

said ISDN overhead converting unit, if the line type carried on the DS0 signal from said integrated access device is ISDN and if this DS0 signal carries a D channel, extracts monitoring/controlling information out of the ISDN overhead information contained in this DS0 signal, and converts a format of the extracted monitoring/controlling information into the TR-303 or GR-303 format, and

if the line type carried on the DS0 signal is ISDN, the user of said gateway digital loop carrier device sets whether or not the DS0 signal carries the D+ channel.

18. (original) A gateway digital loop carrier device according to claim 12, wherein said service state information converting unit sets, to the subscriber service state information, a service state based on the setting by the user of said gateway digital loop carrier device.

19. (currently amended) A gateway digital loop carrier device according to claim 15 comprising:

an integrated access device side terminating unit terminating a transmission signal sent from an integrated access device accommodating as a subscriber at least one of a telephone, a modem and ISDN and implementing a TR-008 interface;

84151916_1

Serial No. 09/960,096

Page 9 of 11

a demultiplexing unit demultiplexing the terminated transmission signal into DS0 signals;

a unit performing interface conversion of the demultiplexed DS0 signal from TR-008 to TR-303 or GR-303;

a TR/GR-303RDT unit based on TR-303 or GR-303 and having a plurality of subscriber ports for sending the interface-converted DS0 signal to a switch implementing a TR-303 or GR-303 interface; and

a subscriber cross connect unit for connecting, to a predetermined subscriber port, the DS0 signal from said integrated access device and the subscriber line accommodated directly in said gateway digital loop carrier device, wherein

said subscriber cross connect unit connects the DS0 signal and the subscriber line to a predetermined subscriber port on the basis of the setting by the user of said gateway digital loop carrier device.

K4151916_1